

**Remarks**

Initially, the courtesy afforded by Examiner Kramer to the applicants' representative during the interview on July 24, 2006 is acknowledged with thanks. During the interview, applicants' representative pointed out that claims 47 and 62 included four auxiliary projections that are spaced apart from each other by substantially equally sized recesses. Examiner Kramer acknowledged that he may have interpreted the claims in a manner that did not take into consideration that each of the four projections are spaced apart from each other by these recesses. Applicants' representative also pointed out that the primary reference in the §103 rejection provided motivation to not replace the hole with a projection from the secondary reference. Examiner Kramer acknowledged this rationale and asked that corresponding arguments be presented in the response so that he could consider them more fully. Applicants' representative also pointed out how claim 64 read on the embodiments of the present invention. The present response memorializes the comments made during the interview.

Claims 47-56, 58, and 61-64 were rejected as anticipated by CHEVALLIER 4,347,017. Reconsideration and withdrawal of the rejection are respectfully requested.

Claims 47-56, 58, and 61-63 include four auxiliary projections that each extend from a different respective corner of the substantially square base and that are spaced apart from

each other by substantially equally sized recesses, where each of the four auxiliary projections extends in a direction of a diagonal of the base crossing the respective corner and having opposite faces that are each substantially parallel to a respective planar side of the base.

CHEVALLIER discloses a block with four projections 21, but these four projections are not spaced apart from each other by substantially equally sized recesses. The two recesses 23 on one pair of sides are not substantially the same size as the two recesses on the other pair of sides. Further, each of the four auxiliary projections does not extend in a direction of a diagonal of the base crossing the respective corner and having opposite faces that are each substantially parallel to a respective planar side of the base. The projections 21 extend parallel to a side of the base (i.e., right-left in the drawings) not in a direction of a diagonal of the base.

Accordingly, CHEVALLIER does not disclose each claimed element and claims 47-56, 58, and 61-63 avoid the rejection under §102.

By way of further explanation, CHEVALLIER discloses a barrier block for defenses protecting coastal and riverside structures. The barrier block comprises a central core of substantially cubic shape. The central core has top and bottom faces, which are provided with respective top and bottom anvil-shaped legs 21. These anvil-shaped legs differ from the claimed

subject matter of claim 47 of the current application, as they each extend in a direction which is parallel to each other and to said top and bottom faces. Therefore, the anvil-shaped legs are not extending in a direction of a diagonal of the central core, nor do they extend from corners of the central core, as they extend along said corners. It is noted that CHEVALLIER discloses that the anvil-shaped legs 21 are provided with a small recess 23 in the center part of the top and bottom legs. It is submitted, that even in an embodiment with such recesses, each of the anvil-shaped legs cannot be considered to be two separate legs, extending from a corner in a direction of a diagonal of the central core. However, even if one were to consider each leg to be two such projections, then the claimed subject matter is still novel over CHEVALLIER, as the two recesses 23 are clearly of a different shape and size than the recesses between the top and bottom legs.

Claims 54 and 63 further avoid this rejection because the reference does not disclose that each of the primary projections is oriented at 45 degrees with respect to the base (e.g., see Figure 3 of the present application wherein projection 2 is oriented 45° with respect to base 1). By contrast, in CHEVALLIER, the projections 3 are oriented at 0° with respect to the base.

Claim 64 defines an element with a first parallelepiped (e.g., elements 2 and 3 in Figure 3) having a first length

measured along a longitudinal axis of the element (e.g., through elements 2 and 3 from top to bottom in the drawing of Figure 3) and a first width that is less than the first length, a second parallelepiped (e.g., element 1 in Figure 3) having a second width greater than a second length, where the first length is greater than the second length and the first width being less than the second width. The first parallelepiped extends symmetrically through a center of the second parallelepiped (e.g., such as shown in Figure 3 by the elements 2/3 extending through a center of element 1) and being oriented so that longitudinal faces of the first parallelepiped are at 45° to longitudinal faces of the second parallelepiped (e.g., note that the faces of element 2 in Figure 3 are 45° to the faces of element 1). Each of the longitudinal faces of the second parallelepiped has two coplanar flat areas separated by a trapezoidal recess (e.g., the recesses between projections 21).

CHEVALLIER does not disclose the first parallelepiped (the combination of projections 3 and center block 11 do not define a parallelepiped), or that each of the longitudinal faces of the second parallelepiped has two coplanar flat areas separated by a trapezoidal recess (only two of the faces have trapezoidal recesses, the other two do not), or that the parallelepipeds are oriented so that longitudinal faces of the first parallelepiped are at 45° to longitudinal faces of the second parallelepiped.

Accordingly, claim 64 also avoids the rejection under §102.

The applicants further explain that independent claims 47, 62 and 64 basically claim a protective element with a large extent of symmetry. The protective element as claimed can be rotated around a virtual axis through the primary projections in steps of 90°, which each time results in basically the same or similar orientation of the protective element. This symmetry gives a huge advantage over the prior art solution of CHEVALLIER. A barrier block according to CHEVALLIER needs to be positioned very carefully, wherein the required orientation of each block depends on the orientation of the neighboring blocks. If this mutual difference in orientation is in-accurate, than the barrier blocks do not sufficiently interlock, which may result in a failure of the wave defense under high loads. Therefore, the positioning of the blocks is carefully controlled, often requiring divers operating under poor eyesight and dangerous conditions to check the orientation. If the orientation is not correct, than the barrier block has to be lifted and replaced. Both the initial placing, the checking, and the replacing requires a considerable amount of time.

In contrast, thanks to the more symmetrical shape of the protective elements according to the present invention, those can be placed much more quickly, without requiring underwater inspections. Reference is being made to the article by M. Muttray

et al. ("Placement and Structural Strength of Xbloc and other Single Layer Armour Units"), which was submitted with the preliminary amendment filed November 23, 2005. Page 7 of this article quotes the guidelines for placement of Accropode armour units, which are in fact the barrier blocks as disclosed in CHEVALLIER. In this article it is shown that the Accropode requires a specific orientation, while the described Xblock (which is the block of the current invention) can be placed with a random orientation. Even with such a random orientation, the model tests (page 8-11) show that interlocking properties are obtained.

Claims 47-56 and 58-64 were rejected as unpatentable over KWEON et al. 6,508,042 in view of TSUZUKI 3,582,017. Reconsideration and withdrawal of the rejection are respectfully requested.

KWEON et al. disclose a block for a coastal structure that includes a perforated hole (12) in the middle of the block (Figures 1A-1B). As explained at column 2, lines 62-64, the hole avoids the concentration of stress. The applicants explain that this refers to the passage of water to disperse an uplifting force. The Official Action would replace this hole with a projection from TSUZUKI. However, it is not believed that one of skill in the art would do this because replacing the hole with a projection would make the device in KWEON unfit for its intended purpose. That is, without the hole the stress would concentrate

and render the block useless or at least not suitable for use as a block for a coastal structure. Accordingly, there is no motivation to combine these references in the manner suggested in the Official Action and thus these claims avoid the rejection under §103.

The applicants further explain that the block in KWEON et al. is used as a basis for wave protection elements and is intended to replace the traditional sandy stones (column 1, lines 17-29; column 2, line 4). In contrast, the protective element according to the current invention is intended to serve as an upper layer block. For this purpose it has to be able to dissipate wave energy and it has to interlock in the three dimensions, in order to withstand wave forces. These are requirements, which lead to a fundamental different block than that of KWEON et al. For this reason, no skilled person would consider KWEON et al. if he was looking for an outer protective element, nor would such a skilled person combine the teaching of KWEON et al. with TSUZUKI.

The middle armour block of KWEON et al. might be considered to have a substantially square base. Looking at Fig. 2 of KWEON et al., one recognizes a square if one extends the side faces of body 10 until they meet in virtual corners of the square. However, it is noted that this intersection in a virtual corner is exactly at the outer periphery of the legs 14. Therefore, the legs 14 do not extend from the respective corners

in the direction of the diagonal of the square base. Rather, they extend in a direction perpendicular to the diagonal direction.

KWEON et al. further lack two projections that extend from the square base. As noted above, the square base has a perforated hole 12 of rectangular shape in the middle of the square base. This perforated hole has a function to pass water upwards and downwards to disperse an uplifting force (column 2, lines 58-60). It is noted that the perforated hole is even one of the features which is presented as solving the object of the invention (column 2, lines 12-17). A skilled person, reading KWEON et al., would not consider placing any extra projections right on this hole, as it would clearly counteract one of the essential features of the middle armour block of KWEON et al. Moreover, the skilled person would not consider adding extra projections to the middle armour block of KWEON et al., as this would inhibit its function: such extra projections would make a flat and regular placement, as shown in Figs. 3 and 4 of KWEON et al., impossible, and therefore interfere with its intended function as middle armour block.

None of the projections of the breakwater blocks of TSUZUKI extend from a corner of the respective core, in a direction diagonal to the core. Therefore, the breakwater blocks of TSUZUKI will have a tendency to be packed much more densely than the protective elements of the current invention. This results in less and smaller cavities between the breakwater



blocks, and therefore in less energy dissipation. Moreover, due to the more dense packing of the blocks of TSUZUKI, there is a larger risk of wave induced lifting forces on the blocks.

Referring to claims 59 and 60, the claimed pointed shape has the advantage that the protective elements can be stored in a very convenient and space efficient manner, on the respective faces of said projections (see fig. 14 of the article by Bas Reedijk et al. "Development of the Xbloc breakwater armour unit" which was submitted with the preliminary amendment). Such a beneficial arrangement is not obvious from TSUZUKI.

Claim 57 was rejected as unpatentable over CHEVALLIER or KWEON et al. and TSUZUKI, further in view of MUTOU et al. JP 403183811A. This claim provides that the protective element is made of a material that comprises a residue material from oil refining, and at least one of sand, granulate, and gravel. MUTOU et al. discloses making an underwater device from slack and sand. Slack is a waste material from a blast furnace and is not a residue from oil refining. Accordingly, this claim avoids this rejection under §103.

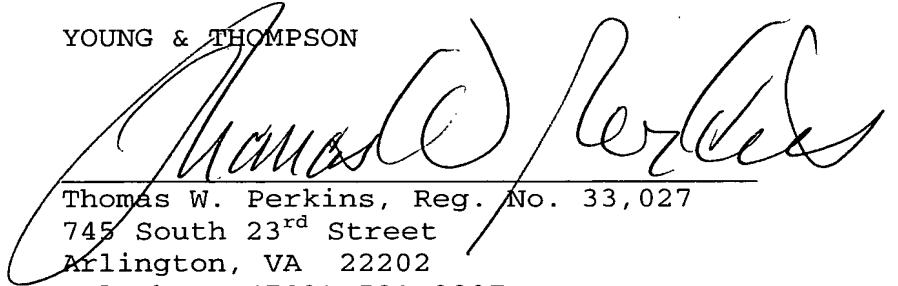
Claims 59-60 were rejected as unpatentable over CHEVALLIER. These claims depend from claim 47 and are allowable for the reasons set forth above.

In view of the foregoing remarks, it is believed that the present application is in condition for allowance. Reconsideration and allowance are respectfully requested.

The Commissioner is hereby authorized in this, concurrent, and future replies, to charge payment or credit any overpayment to Deposit Account No. 25-0120 for any additional fees required under 37 C.F.R. § 1.16 or under 37 C.F.R. § 1.17.

Respectfully submitted,

YOUNG & THOMPSON

A large, stylized handwritten signature in black ink, appearing to read 'Thomas W. Perkins', is written over the typed name and address.

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